

February 11, 2003

TO: Internal File

THRU: Greg Galecki, Reclamation Hydrologist and Team Lead

FROM: Priscilla Burton, Reclamation Specialist/Soils

RE: Refuse Pile, Canyon Fuel Company, Dugout Canyon Mine, C/007/039-SR02D-1, Internal File

SUMMARY:

Coal mine waste from the Dugout Canyon Mine is currently disposed of underground or at the approved waste rock disposal facility at either SUFCO or Skyline Mines or at the Banning Loadout (Section 528.300 of the approved MRP). A proposal for a waste rock storage site was presented to the Division in April of 2002, four years after mine construction. Information supplemental to this application was received on August 2002 and January 8, 2003.

The proposed refuse disposal area is located in T14S R12E, N½ NE¼ Section 18. The site is located at an elevation of 5,900 feet on a pediment composed of gravelly alluvial deposits overlying the Mancos Shale. The triangular shaped permit area **covers 26.8 acres (Section 114 pages 1-24 and 1-25) of which, 15.8 acres will be disturbed (RA Attachment 2-2)**. The permit area is immediately adjacent to the county road, approximately 2.5 miles east of the Soldier Creek road intersection. Refuse disposal will consume 5.7 acres. The rest of the disturbed area (10.1 acres) will either be dedicated for topsoil storage, sediment pond, access roads, general storage or remain undisturbed.

This review only addresses the soils related deficiencies outlined in the October 24, 2002 Technical Analysis for SR02D. The major points of this review are listed here:

- There will be no disturbance in soil unit H as shown on Soils Map RA Plate 2-1. Plate 5-1 Storage Area Layout shows the slope, designated soil J will be affected by construction of the sediment pond spillway. Disturbance of Unit J will provide an additional 7 – 10 cu yds of topsoil.

TECHNICAL MEMO

- To avoid an abrupt layer between the refuse and the subsoil, the first six inches of subsoil should be ripped into the refuse prior to application of the remaining subsoil and topsoil.

TECHNICAL ANALYSIS:

ENVIRONMENTAL RESOURCE INFORMATION

Regulatory Reference: Pub. L 95-87 Sections 507(b), 508(a), and 516(b); 30 CFR 783., et. al.

CLIMATOLOGICAL RESOURCE INFORMATION

Regulatory Reference: 30 CFR 783.18; R645-301-724.

Analysis:

Page 7-5 of the submittal indicates that climatological information for the refuse site is found in RA Attachment 7-5. The submittal also includes some climatological information for the higher elevation of the mine site, pages A4-2-1 through A4-2-9 of Appendix 4-1.

Refuse Site

The elevation of the refuse site is approximately 5,900 feet. Precipitation information has been provided from the Price Warehouse at elevation 5,700 feet and from the Wellington station at 5,400 feet. The Wellington station is closer to the refuse site.

Over thirty years (1968 through 1997), the Price area has received an average annual precipitation of nine inches according to the Price Warehouse weather station data from the National Oceanic and Atmospheric Administration (NOAA). At the Wellington station over an eighteen year period (1980 through 1997), the average annual precipitation was also nine inches.

Data from the Utah Climate Center for the Price station indicates that the months of July through October have the greatest precipitation (with an average of one inch falling in each month). Snowfall is greatest in December and January (between six and nine inches each month). Data from the NOAA for the Wellington Station confirms that seasonally, the late summer and fall months provide the most consistent, highest monthly averages for precipitation. This pattern of precipitation suggests a late summer seeding might be successful. In late summer, the average monthly temperatures are in the mid-seventies (degrees Fahrenheit).

Mine Site

Figure 3 (page A-2-4-6) is an isopleth of the mean annual precipitation for central Utah, showing the refuse site in a location receiving approximately 12 inches precipitation annually. The source of this information is the USGS. For a one year period from May of 1978 to April of 1979, the annual precipitation amounted to 12.3 inches, with the maximum snow/rainfall occurring from November through March (Table 1, information from the Wellington weather monitoring station).

Figure 4 graphically summarizes the seasonal precipitation for the years 1958 to 1965 from the Sunnyside weather station.

Findings

The information provided meets the minimum requirements of the climatological information section of the regulations

SOILS RESOURCE INFORMATION

Regulatory Reference: 30 CFR 783.21; 30 CFR 817.22; 30 CFR 817.200(c); 30 CFR 823; R645-301-220; R645-301-411.

Analysis:

The proposed waste rock disposal site was disturbed in 1998 and 1999 for gravel and fill to construct the adjacent county road.

Undisturbed soils surrounding the site fall into the following Soil Conservation Service Map Units:

- 49, Haverdad Loam, alkali 0 – 3% slopes,
- 50, Haverdad loam, moist, 1 to 5% slopes, and
- 66, Mivida **gravelly** fine sandy loam, 3 to 8 % slopes (see Soils Map RA Plate 2-1 and Appendix S5 of RA Attachment 2-1 Soils Report).

Map Unit 66 would have been the pre-dominant soil prior to disturbance according to the 1988 Carbon County Soil Survey Sheet No.21. The Mivida soil is the State Soil of Utah (see <http://www.ut.nrcs.usda.gov/soils/flashsite>). The Natural Resources Conservation Service describes the Mivida Series as coarse-loamy, mixed, superactive, Mesic Ustic Haplocalcids (formerly classified as Ustollic Calciorthids in the 1988 Carbon County Soil Survey). The typical pedon for the Mivida Series described in the 1988 Carbon County Soil Survey was located in the NW corner of Section 18, T.14 S., R. 12 E, within one half-mile of the waste rock disposal site.

TECHNICAL MEMO

The disturbed soils of the proposed refuse disposal site were surveyed in 1999 by Mr. Daniel Larsen, Soil Scientist with Environmental Industrial Services of Helper, Utah. Using supporting information obtained from 10 pits and twenty-two soil samples, Attachment 2-1 identifies and describes thirteen soil map units at the site. The soil map units are shown on Soils Inventory Map SM-1 in Attachment 2-1. The map units have been reproduced on Soils Map RA Plate 2-1, except that RA Plate 2-1 does not show the soil type L that covers an area of about 50 X 85 feet (approximately 0.1 acres). The plan indicates on page 2-5 that Map unit L was a pile of gravel on top of the soil that has been removed from the site. (However, during a site visit on January 21, 2003, the pile of gravel was still on the site. It is a very small pile and can be removed prior to soil salvage.) Soil characteristics at the site are described in RA Attachment 5-2.

Undisturbed soils remain to a limited extent within the proposed permit boundary. The Haplocalcids (Map Unit 66) are represented by sample site DCW5 or Map Unit I on the southwest edge of the disturbed area and sample location DCW6 or Map Unit D on the west. Mr. Larsen indicates that the texture of the soils places them either in the Strych or Hernandez series. RA Attachment 2-1 and Plate RA-2-1 Soils Map for the proposed refuse site identifies soils immediately adjacent to the north and west permit area boundary as Map Unit 66, suggesting that Map Unit F would have also been a Ustic Haplocalcid.

Strych very stony loam soils can be found within Map Unit 66 (1988 Carbon County Soil Survey). Strych soils are loamy-skeletal, mixed mesic Ustic Haplocalcid (formerly classified as Ustollic Calciorthids in the 1988 Carbon County Soil Survey). Hernandez soils are fine-loamy, mixed, mesic Ustollic Calciorthids. The Hernandez soils are deeper soils than the Strych, with far less stones, cobbles, and pebbles.

Order: Aridisol (formed in desert climate)
Suborder: Calcic (accumulation of calcium carbonate)
Great Group: Haplocalcid (other calcids)
Subgroup: Ustic Haplocalcid
(moisture control section is dry less than $\frac{3}{4}$ of the time when the temperature is above 5 C and aridic soil moisture regime bordering on ustic)

The Haverdad loam series soils (Torrifluvents, Map Units 49 and 50) are represented by site DCW10 or Map Unit H along the south and east of the disturbed area.

Order: Entisol (young, little horizonation, little pedogenesis)
Suborder: Fluvents (flood plain)
Great Group: Torrifluvents (aridic or torric moisture regime)
Subgroup: Typic Torrifluvents (other Torrifluvents) or
Subgroup: Ustic Torrifluvents
(moisture control section is dry less than $\frac{3}{4}$ of the time when the temperature is above 5 C and aridic soil moisture regime bordering on ustic)

Map Unit J has been outlined between Map Unit H and the gravel pit. The plan indicates on page 2-5 that there will be no disturbance in this soil unit (see also Storage Area Layout RA Plate 5-1). However, Plate 5-1 Storage Area Layout shows the construction of the sediment pond spillway on the slope, designated as soil unit J. The Division estimates this construction to disturb approximately 400 sq ft.

The soil survey for map unit J describes the soils as Strych, Map Unit 66, Mivida gravelly fine sandy loam, 3 to 8 % slopes. The 1988 Carbon County Soil Survey describes this map unit as having a 4 inch surface layer. Therefore a six inch layer could be salvaged according to R645-301-232.300. Therefore, the Division estimates that the 400 sq ft area could contribute an additional 7 or 10 cu yds of topsoil.

Soil productivity of the area was evaluated in June, 1998, by Mr. George S. Cook, Range Conservationist with the NRCS (Section 321.200). Mr. Cook's letter is found in RA Attachment 3-1. Mr. Cook estimated that the gravel borrow pit, now proposed for the refuse disposal area, had 500 lbs/acre productivity with a potential for 550 lbs/ac.

The application indicates in Section 321.200 that the reference area for the site corresponds to the topsoil storage area surveyed by Mr. Cook in 1998. Mr. Cook reports productivity for a topsoil storage area as 460 lbs/acre with a potential for 500 lbs/ac. The condition was Mid Seral fair. In a telephone conversation on January 31, 2003, Mr. Cook indicated the area he surveyed was located in Sec 8, T 14 S, R 12 E approximately 4-500 feet east and 600 feet south from the NW corner of the NE ¼. The location Mr. Cook surveyed corresponds with that of the reference area identified on RA Figure 3-1.

In the Division's opinion, the reference area soils fall into Map Unit 50, Haverdad loam, 0 to 8 percent slopes, an inclusion of Map Unit 49. This opinion is supported by the sagebrush/grass vegetation type shown on Figure RA 3-1 and observations of the site during a field visit on January 21, 2003. This soil type along with Map Unit 66, Mivida gravelly fine sandy loam, used to exist within the proposed refusal disposal disturbed area before county road construction.

The application describes the dominant grasses as Salina wildrye and galleta grass and the dominant forb as locoweed. Locoweed is a common name for species within three plant genus: Aragalus, Astragalus and Oxytropis.

Findings

The information provided is adequate to describe the pre-mining soil resources.

TECHNICAL MEMO

PRIME FARMLAND

Regulatory Reference: 30 CFR 785.16, 823; R645-301-221, -302-270.

Analysis:

As noted in Section 221, the prime farmland status of the area was investigated in April 1996 by the Natural Resources Conservation Service. A letter from the NRCS is located at the end of RA Attachment 3-1 Vegetation Data. In the letter, the State Soil Scientist, William Broderson, writes that the area could not contain important farmlands because there is no developed irrigation system on arid soils.

Two of the soils identified in Appendix S5 of RA Attachment 2-1, soil #50 Haverdad loam and soil Hernandez family soils are potentially prime farmland soils, when irrigated. Soil #50 Haverdad loam is in the land use capability class II-e-2. Soils in the Hernandez family range from land use capability class II-e-2 to III-e-2.

The recent use of the site (1988- 1999) has been for a gravel pit and much of the original soil surface has been lost. The Dugout Canyon Mine is the landowner. The post-mining land use is wildlife habitat and grazing.

Findings:

The Division concurs with the Natural Resources Conservation Service that there is no source of irrigation for farming and therefore no prime farmlands at the site.

OPERATION PLAN

AIR POLLUTION CONTROL PLAN

Regulatory Reference: 30 CFR 784.26, 817.95; R645-301-244, -301-420.

Analysis:

The application indicates that operations will be conducted in accordance with the current Air Quality Approval Order (AO) dated January 5, 1999 (Appendix 4-1). The AO indicates that visible emissions are limited to 20% opacity and fugitive dust will be controlled with water sprays and/or chemically treated. Treatment shall be of sufficient frequency and quantity to maintain a damp surface.

Findings:

The information provided meets the requirements of the regulations.

TOPSOIL AND SUBSOIL

Regulatory Reference: 30 CFR Sec. 817.22; R645-301-230.

Analysis:

Topsoil Removal and Storage

The triangular shaped permit area covers 26.8 acres (Section 114, page 1-24) of which 15.8 acres will be disturbed (RA Attachment 2-2). The refuse storage area will consume 5.7 acres. The rest of the site (10.1 acres) will either be dedicated for topsoil storage, access roads, general storage or undisturbed. The application must provide the acreage of Map Unit H and J that will be undisturbed.

RA Plate 2-1 outlines areas of substitute topsoil salvage and depths of salvage. RA Attachment 2-1 indicates that no soil will be salvaged in map units H and J on the eastern leg of the triangular disturbed area. The plan indicates that the combined acreage of H and J is approximately 11.2 acres (Section 242.100 and RA Attachment 2-2). The acreage to be reclaimed sums to 16.1 acres (RA Attachment 2-2). The total permit area would then be $11.2 + 16.1 = 27.3$, within 0.5 acres of the 26.8 acres stated in Section 114 of the plan.

However, the plan does not account for the acreage of disturbance in the area J soils for the construction of the sediment pond spillway. During the week of February 17th, 2003, Mr. Dan Larsen evaluated the soils in Map Units J and H. This soils information will be included with as-built details (personal communication from Vickie Miller on February 18, 2003).

There is no topsoil available for salvage on the previously disturbed site. However, there are areas of suitable substitute topsoil. The application indicates that a soil scientist will be on-site during soil salvage operations.

RA Table 2-2 estimates the volume of salvageable soil as 44,317 cubic yards. The acreage of recovery sums to 16.1 acres. Half of the substitute topsoil will come from areas B, C and E described in RA Table 2-1 as gravelly, loam and gravelly, clay loam. Soils in map units B and C are suitable as subsoil (section 3.4 of Attachment 2-1) and will be stored in a subsoil stockpile described in Section 231.100. The least rocky soils and most suitable substitute topsoils in the project area are those in map units D, E, and F. Soils from areas D, E, F, K and G will be stored in a topsoil stockpile (Section 231.100).

TECHNICAL MEMO

Section 232.100 indicates that the figures for substitute topsoil recovery in RA Table 2-2 and RA Attachment 2-2 are “based on an average of “ the recommendations for recovery in Table 3.41 of Attachment 2-1 Soils Report. In the case of soil units A, B, C, E, G, K, L and M soil recovery has been over estimated. The total over estimation is approximately 5,840 cu yds. The excess soil will be placed in the subsoil pile. The boulders (unit K) will be stockpiled separately (Section 234.100). Most of the piled gravel (unit L) has been moved from the site, with the remaining gravel to be removed before soil salvage.

Substitute topsoil will be stockpiled in the northwest corner of the disturbed area (RA Plate 5-1 and Plate 2-2). Subsoil and topsoil will be stockpiled separately (Section 234.100). Each pile will be signed. As built drawings of the soil stockpiles will be provided for the site. The 30,542 cu yds of subsoil will be stored on 2.1 acres. The 13,775 cu yds of topsoil will be stored on 1.3 acres. A road will pass along the eastern edge of the substitute topsoil stockpiles. A ditch and berm will surround the piles.

The soil will be placed in 1.5 to 2 foot lifts with track equipment. The soil stockpile will be twenty feet deep and at least 200’ wide. The stockpile will be stabilized by the interim seed mix (grasses) described in Section 341.200. The plan indicates in Section 242.200 that soils will be handled when they are in a loose or friable condition.

Findings:

The information provided addresses the minimum operations topsoil and subsoil requirements of the regulations.

SPOIL AND WASTE MATERIALS

Regulatory Reference: 30 CFR Sec. 701.5, 784.19, 784.25, 817.71, 817.72, 817.73, 817.74, 817.81, 817.83, 817.84, 817.87, 817.89; R645-100-200, -301-210, -301-211, -301-212, -301-412, -301-512, -301-513, -301-514, -301-521, -301-526, -301-528, -301-535, -301-536, -301-542, -301-553, -301-745, -301-746, -301-747.

Analysis:

Refuse Piles

Coal mine waste consisting of shale, sandstone, and sediment pond waste will be stored in the refuse pile (Section 536.200). RA Attachment 5-4 and the MRP Appendix 5-7 contain laboratory analysis of waste material that is representative of the type of material to be disposed at the waste rock site:

- A 1995 analysis of the Rock Canyon Seam and the Gilson Seam, roof and floor.
- A 1998 analysis of waste rock.

- A 2001 analysis of sediment pond clean-out material.
- A 2002 analysis of rock from the Gilson Well development.

The Rock Canyon coal sample, the Sodium Adsorption Ratio, pH and Available Water Capacity are rated poor. Both the Rock Canyon and the Gilson Roof coal samples are sodic since their Exchangeable Sodium Percentages both exceed 15% (i.e., 17% and 25%, respectively). The Gilson Seam coal and roof have little carbonate buffering capacity. The pulverized material has a texture of sand, sandy loam or loam.

Appendix 5.7 of the MRP contains the analytical results of waste rock samples taken in 1998. This waste also had little buffering capacity. This waste has a fair rating for Electrical Conductivity (EC = 4.36 mmhos/cm). The 2001 analysis of the sediment pond clean out material has a high EC (6.84 mmhos/cm) reflecting the probable use of salts on road surfaces during the winter.

The proposed refuse pile has the capacity for 48,900 cu yds (72,600 Tons at a unit weight of 1.10 lb/ft³) of coal mine waste (RA Attachment 5-3). The life of the site is estimated at 15 years (Section 536.100) with a production of 5,000 Tons/yr. Geotechnical characteristics of this waste are described in RA Attachment 5-2. The waste has a Unified Soil Classification of GP-GM (gravel sand silt mixture).

A representative sample will be collected of every 2000 cu yds (or 2,970 Tons) to be analyzed for the full suite of parameters required by Table 6 of the 1988 Division Guidelines for Management of Topsoil and Overburden for Underground and Surface Coal Mining (Section 536.200). The full suite of parameters includes: Sodium Adsorption Ratio, particle size analysis, Total and Nitrate-nitrogen, % Organic Carbon, Exchangeable Sodium and Available Water Capacity. This rate of sampling amounts to 24 samples for the completed 6 acre site. This information would be best supplied with the Annual Report for the Dugout Canyon Mine site.

Findings:

The information provided meets the minimum operations spoil and waste material requirements of the regulations.

MAPS, PLANS, AND CROSS SECTIONS OF MINING OPERATIONS

TECHNICAL MEMO

Analysis:

Affected Area Maps

RA Plate 5-1 Storage Area Layout shows the refuse storage area, an access road, the sediment pond, two storage areas and a location for soil stockpiling. The layout of the area dedicated to stockpiling is shown on RA Plate 2-2 Soil Stockpiles.

Section 358.500 indicates that a fence around the disturbed portion of the permit (16 acres) will exclude and protect the undisturbed acreage of soil map units H and J from operations.

Findings:

The information provided addresses the minimum operations maps and plans requirements of the regulations.

RECLAMATION PLAN

TOPSOIL AND SUBSOIL

Regulatory Reference: 30 CFR Sec. 817.22; R645-301-240.

Analysis:

Redistribution

Section 242.100 and RA Attachment 2-2 outline four feet of cover (3.5' of subsoil and .5' of topsoil) over the refuse pile. This will require approximately 32,073 cu yds of subsoil and 4,582 cu yds of substitute topsoil (total of 36,700 cu yds of soil). The remainder of the site (9.92 acres) will be covered with six inches of substitute topsoil (7,610 cu yds). In fact, approximately 1.5 acres of the refuse pile will receive greater than six inches of topsoil under this plan, as the plan for recovery of 13,775 cu yds will satisfy the requirement for 12,583 cu yds of substitute topsoil with excess.

Prior to redistribution, the substitute topsoil will be sampled and analyzed for pH, EC, total Carbon, SAR, Phosphorus, Nitrate-nitrogen and water holding capacity (Section 243).

Where operations have created compaction, the ground will be ripped to a depth of 1.5 to 2.0 feet (Section 242.200). The plan indicates on page 2-14 (Section 242.200) that the surface of

the reclaimed refuse pile will be ripped prior to placement of soil and again after placement of the first lift of subsoil. The second ripping will be to a depth of twelve inches and will serve to eliminate an abrupt boundary between the two layers, promoting rooting into the refuse.

The substitute topsoil will be spread using track-mounted equipment only. Erosion will be controlled with gouging (Section 242.200) and 1 Ton/acre hay incorporation as described in Section 341.200 (page 3-11).

Findings:

The information provided meets the minimum reclamation topsoil and subsoil requirements of the regulations.

STABILIZATION OF SURFACE AREAS

Regulatory Reference: 30 CFR Sec. 817.95; R645-301-244.

Analysis:

The soils of the site are Haverdad loam (#50) and the Hernandez family and the Strych series soils. These soils have erosion factors between 0.28 and 0.37 according to the 1988 Carbon County Soil Survey. Even at the relatively mild slope of 3h:1v proposed for the refuse disposal site, these exposed soils will be highly susceptible to erosion from water. Wind erosion is also a concern for these soils once they are disturbed.

The application indicates on page 3-9 that 1 Ton/ac hay mulch will be applied to the topsoil. The approved MRP Section 340 indicates 2000 lbs of wood fiber mulch will be applied with a tackifier to the seeded site.

The application indicates the site will be roughened with gouging (Section 242.200). This information supercedes that found in the MRP Chapter 3 which indicates that the gouging technique will be limited to slopes too steep to retain a mulch application (page 3-44).

The site will be mulched according to the methods described in Chapter 3 of the approved MRP. Rills and gullies in excess of nine (9) inches will be filled and reseeded (Section 244.300).

Section 341.200 indicates that 1 Ton/acre hay will be gouged into the surface to help reduce wind and water erosion.

TECHNICAL MEMO

Findings:

The information provided is adequate for the purposes of the Regulations.

RECOMMENDATIONS:

The refuse pile amendment should be approved.